



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

"The Interaction of Structural and Semantic Biases in Coherence and Coreference"

Citation for published version:

Rohde, H & Kehler, A 2009, "The Interaction of Structural and Semantic Biases in Coherence and Coreference", CUNY 2009, California, United States, 26/03/09 - 28/03/09.
<<http://www.unc.edu/cuny08/CUNY2008%20Posters%20in%20Order%20by%20Session.pdf>>

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

Publisher Rights Statement:

© Rohde, H., & Kehler, A. (2009). "The Interaction of Structural and Semantic Biases in Coherence and Coreference". Poster session presented at CUNY 2009, California, United States.

General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.





NORTHWESTERN
UNIVERSITY

The Interaction of Structural and Semantic Biases in Coherence and Coreference

Hannah Rohde & Andrew Kehler



1. Goal

To test for an interaction of semantic and structural biases on comprehenders' expectations about (i) next mention (coreference) and (ii) discourse direction (coherence).

2. Previous Work: Semantic Biases

Sentence completions: Strong bias in contexts with implicit causality (IC) verbs to re-mention the causally implicated referent (Caramazza, Grober, Garvey, Yates 1974; McKoon, Greene, Ratcliff 1993; *inter alia*).

(1) Effect of verb on coreference

- Amanda amazed Brittany because **she** *ran a marathon*.
- Amanda scolded **Brittany** because **she** *was misbehaving*.

→ IC verb (and speakers' causal reasoning and event knowledge) influence coreference, yielding bias to re-mention Amanda in (1a) and Brittany in (1b)

Story continuations: Strong bias in IC contexts to continue the discourse with a sentence describing the cause of the IC event (Rohde & Kehler 2008).

(2) Effect of verb on coherence

- Amanda amazed_{IC} Brittany. *She ran a marathon last year.*
- Amanda babysat_{NonIC} Brittany. *Brittany's mother is grateful.*

→ IC verbs increase expectation for an upcoming Explanation relation (as opposed to Occasion, Result, Violated Expectation, Parallel, etc.)

3. Previous Work: Structural Biases

Comparing story continuations with full-stop and pronoun-prompt conditions suggests that pronouns overlay a subject bias on coreference preferences (Stevenson et al, 1994; *inter alia*).

(3) Prompt Types

- Amanda amazed Brittany. <= bias to re-mention Amanda
- Amanda amazed Brittany. She <= stronger bias to Amanda

→ Presence of a pronoun increases bias that subject is being re-mentioned

References

- Garvey, C. & A. Caramazza. (1974). Implicit causality in verbs. *Linguistic Inquiry* 5.459-464.
 McKoon, G., S. Greene, & R. Ratcliff (1993). Discourse models, pronoun resolution, and the implicit causality of verbs. *Journal of Experimental Psychology* 19.5.1040-1052.
 Rohde, H. & A. Kehler (2008). Demanding an Explanation: Implicit causality biases in discourse interpretation. Poster presented at the 21st CUNY.
 Stevenson, R., Crawley, R., & Kleinman, D. (1994). Thematic roles, focusing and the representation of events. *Language and Cognitive Processes*, 9, 519-548.

Contact: hannah@northwestern.edu

4. Story Continuation Experiment

Goal: Test interaction of semantic and structural biases by holding the propositional semantic content of a passage constant while varying the structural position of the causally-implicated referent.

2 x 2 Design: voice (active/passive) x prompt type (pro/no-pro)

Task: write natural continuation for context sentence and prompt

Materials: 20 subject-biased IC verbs

(4) Prompt Type & Voice

- Active_NoPro** Amanda amazed Brittany. _____.
- Active_Pro** Amanda amazed Brittany. She _____.
- Passive_NoPro** Brittany was amazed by Amanda. _____.
- Passive_Pro** Brittany was amazed by Amanda. She _____.

Evaluation: judges annotated for next mention & continuation type

5. Predictions

Coreference

Semantic biases alone: Preference for causally implicated referent (Amanda)

- Bias to subject (4a, 4b)
- Bias to non-subject (4c, 4d)

Integrated semantic & structural biases: Stronger preference for causally implicated referent (Amanda) in (4b) than (4a) because Amanda is in subject position and pronoun introduces a subject bias. Weaker preference in (4d) than (4c) because Amanda is in the non-subject position but the pronoun introduces a subject bias.

- (4a) Bias to subject Amanda
- (4b) Increased bias to subject Amanda
- (4c) Bias to non-subject Amanda
- (4d) Reduced bias to non-subject Amanda

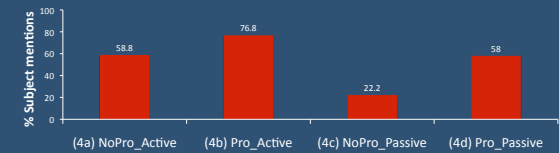
Coherence

Semantic biases alone: Preference for Explanations regardless of voice/prompt

Integrated semantic & structural biases: Stronger preference for Explanations in (4b) than (4a), but weaker preference in (4d) than (4c) because, in both cases, the pronoun shifts discourse biases in favor of subject-biased coherence relations.

- (4a) Bias to Explanations
- (4b) Increased bias to Explanations relative to (4a)
- (4c) Bias to Explanations
- (4d) Reduced bias Explanations relative to (4c)

6. Coreference Results



Semantic bias: Overall preference for causally implicated referent

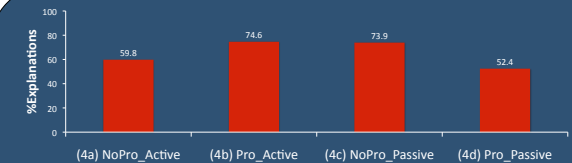
[Effect of voice: $F(1,40)=22.88$, $p<0.001$; $F(1,19)=73.45$, $p<0.001$]

Structural bias: Overall preference for subject is higher w/pronoun than no-pro

[Effect of prompt: $F(1,40)=43.12$, $p<0.001$; $F(1,19)=63.39$, $p<0.001$]

Interaction of biases: Passive pronoun-prompt condition (4d) yields a reduced preference for the causally implicated referent (away from the non-subject 'Amanda' in 'Brittany was amazed by Amanda')
 [Interaction: $F(1,40)=7.08$, $p<0.05$; $F(1,19)=6.38$, $p<0.05$]

7. Coherence Results



→ Fewest Explanations in (4d): causally implicated referent is in non-subject position and pronoun shifts next-mention and coherence biases to subject.

[No effects of voice or prompt]

[Crossover Interaction: $F(1,40)=18.46$, $p<0.001$; $F(1,19)=25.82$, $p<0.001$;

Active pairwise: $F(1,40)=4.73$, $p<0.05$; $F(1,19)=6.11$, $p<0.05$;

Passive pairwise: $F(1,41)=20.18$, $p<0.001$, $F(1,19)=9.56$, $p<0.01$]

8. Conclusion

Even in contexts with strong semantic biases, the mere occurrence of a fully-ambiguous pronoun not only shifts interpretation biases toward the subject referent, but also influences comprehenders' expectations about how the discourse will be coherently continued.